JC10 Rec'd PCT/PTO 19 FEB 2002

FORM PTO-1390 (REV 11-2000)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 3573-13

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO (If known, see 37 C.F.R. 1.5): 10/049810 (unknown)

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/IB00/01085	03/08/2000	19/08/1999

TITLE OF INVENTION
ROUTING REDUNDANCY METHOD IN A POINT TO MULTIPOINT RADIO SYSTEM FOR AN ACCESS TERMINAL

APPLICANT(S) FOR DO/EO/US
NASCIMBENE, Adrea

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The U.S. has been elected by the expiration of 19 months from the priority date (Article 31).
5. A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☒ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has **NOT** expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 To 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information. PTO Form 1449

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
10/049810	PCT/IB00/01085	3573-13

21. ☒ The following fees are submitted:

	CALCULATIONS	PTO USE ONLY
BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):		
-- Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....$1040.00		
-- International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....$890.00		
-- International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO.....$740.00		
-- International preliminary examination fee (37 C.F.R. 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4).....$710.00		
-- International preliminary examination fee (37 C.F.R. 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4).....$100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☒ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$ 130.00	

CLAIMS	NUMBER FILED		NUMBER EXTRA	RATE			
Total Claims	6	-20 =	0	X	$18.00	$ 0.00	
Independent Claims	1	-3 =	0	X	$84.00	0.00	
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)					$280.00	$ 0.00	
CLAIM FEES ARE NOT BEING PAID AT THIS TIME			**TOTAL OF ABOVE CALCULATIONS =**			$ **1020.00**	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.						0.00	
					SUBTOTAL =	$ **1020.00**	
Processing fee of $130.00, for furnishing the English Translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(f)).					+	0.00	
					TOTAL NATIONAL FEE =	$ **1020.00**	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). **$40.00** per property					+	$ 0.00	
Fee for Petition to Revive Unintentionally Abandoned Application ($1280.00 – Small Entity = $640.00)						$ 0.00	
					TOTAL FEES ENCLOSED =	$ **1020.00**	
						Amount to be: refunded	$
						Charged	$

a. ☒ A check in the amount of $1020.00 to cover the above fees is enclosed.
b. ☐ Please charge my Deposit Account No. 14-1140 in the amount of $_____ to cover the above fees. A duplicate copy of this form is enclosed.
c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-1140. A duplicate copy of this form is enclosed.
d. ☒ The entire content of the foreign application(s), referred to in this application is/are hereby incorporated by reference in this application.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

H. Warren Burnam, Jr.
NAME

29,366 REGISTRATION NUMBER

February 19, 2002 Date

603264

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

NASCIMBENE, Andrea — Atty. Ref.: 3573-13

Serial No. unknown — Group:

Filed: February 19, 2002 — Examiner:

For: ROUTING REDUNDANCY METHOD IN A POINT TO MULTIPOINT RADIO SYSTEM FOR AN ACCESS TERMINAL

* * * * * * * * * * *

February 19, 2002

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

In order to place the above-identified application in better condition for examination, please amend the application as follows:

IN THE SPECIFICATION

Please substitute the following paragraphs in the specification for corresponding paragraphs previously presented. A copy of the amended specification paragraphs showing current revisions is attached.

Page 1, before the first line, insert as a separate paragraph:

This application is the US national phase of international application PCT/IB00/01085 filed 3 August 2000, which designated the US.

IN THE CLAIMS

Please substitute the following amended claims for corresponding claims previously presented. A copy of the amended claims showing current revisions is attached.

3. Re-routing as claimed in claim 1, wherein the host radio node is capable to be allocated to other access terminal located in the same sector and has the possibility to bear an additional traffic.

4. Re-routing as claimed in claim 1, wherein said alternative radio node is located in the same hub as the radio node with respect to which it has been switched.

5. Re-routing as claimed in claim 1, wherein said alternative radio node is located in a hub different than the one where the radio node with respect to which it has been switched is.

REMARKS

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made**."

Respectfully submitted,

NIXON & VANDERHYE P.C.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

Page 1, before the first line, insert as a separate paragraph:

This application is the US national phase of international application PCT/IB00/01085 filed 3 August 2000, which designated the US.

IN THE CLAIMS

3. Re-routing as claimed in ~~any~~ claim 1~~. and 2.~~, wherein the host radio node is capable to be allocated to other access terminal located in the same sector and has the possibility to bear an additional traffic.

4. Re-routing as claimed in ~~any~~ claim 1~~. to 3.~~, wherein said alternative radio node is located in the same hub as the radio node with respect to which it has been switched.

5. Re-routing as claimed in ~~any~~ claim 1~~. to 3.~~, wherein said alternative radio node is located in a hub different than the one where the radio node with respect to which it has been switched is.

ROUTING REDUNDANCY METHOD IN A POINT TO MULTIPOINT RADIO SYSTEM FOR AN ACCESS TERMINAL

= * = * = * =

FIELD OF THE INVENTION

This invention relates to an access terminal re-routing redundancy capability for point-multipoint systems.

BACKGROUND OF THE INVENTION

It is well known that subscribers and/or operators in a radio communication system (typically in a radio communication system of the type shown in Fig. 1 of the annexed drawings) may wish an optional superior reliability, able to avoid any system outage. Such superior reliability is of interest also for operators, not only in order to guarantee the service quality, but also to prevent any loss of revenue during possible black outs.

The number of radio nodes (RNs) needed to a Hub site to cover many sectors depends on many factors, and is directly related to the number of the subscriber terminals in the covered area and on the traffic generated by the same terminals.

SUMMARY OF THE INVENTION

The invention faces the problem with a totally different, new and original approach, by proposing a high redundancy configuration, which is based just on the capacity of an access terminal (AT) of a subscriber to be switched from the home radio node (home RN) - when it is inserted in the normal traffic condition - to a host radio node (host RN) - which is in this way allocated, upon failures, to other access terminals (AT) which are in the same sector and having the possibility of bearing an additional traffic.

More precisely, the invention relates to access terminal re-routing redundancy capability in point-multipoint radio communication systems, consisting of giving an access terminal the feature to automatically and autonomously switch from a radio node, to which it is normally connected, to an alternative radio node, usually not dedicated to the redundancy functionality and independently located in the same or in other hubs.

In this system, a logic of switch and redundancy is provided in the access terminal, which is apt to automatically switch to the alternative radio node (host) upon failure in the connection which normally operates between the terminal itself

and the home radio node, while the alternative (host) radio node has the capability to be allocated to other access terminals, which are located in the same sector and has the possibility to bear an additional traffic.

Furthermore, when the alternative radio node is located in a radio node different from the one where is the radio node with respect to which it has been switched from the access terminal, the latter is provided with two antennas, which are directed towards said two different hubs, and with a two-ways radio frequency switch or with a single antenna with electronically routed beams.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is now described more in depth below, with reference to the annexed drawings, wherein:

Fig. 1 shows, as above mentioned, the scheme of a typical radio communication system to which the present invention applies;

Fig. 2 is a scheme showing a first way to carry out the invention; and

Fig. 3 is a scheme showing a second way to carry out the invention.

With reference to Fig. 2, the invention comprises a hub 1, which accommodates a number of radio nodes (RN) 2, 3, ...Y, each controlled by a control unit 4, 5, ...Z of the node, and a management system (MS) 6. Normally, the subscriber terminal (AT) 7 is connected to the home radio node (home RN) 2, namely it is inserted in a normal traffic condition. When, upon a failure, this connection is interrupted (as depicted at I in Fig. 2), according to the invention said terminal 7 is switched towards the host radio node Y. To this purpose, a redundancy switching logic is provided in the subscriber access terminal 7, which is apt to automatically switch upon failure in the connection normally operating between terminal 7 and radio node 2.

Thereby, the invention very simply provides a high redundancy configuration, which is based just on the capability of the subscriber access terminal (AT) (7 in the case of Fig. 2) to be switched from the home radio node (home RN 2 in the case of Fig. 2) to a host radio node (host RN Y), namely to a radio node which is normally allocated to other access terminal (AT) of the same sector, but which exhibits the possibility to bear an additional traffic.

In the inventive system, the host radio node may be arranged not only in the same home hub 1, such as in the case of Fig. 2, but also in a hub different than the one containing the home radio node RN, i.e. in a host hub 8, such as in

the case of Fig. 3. When the host radio node RN belongs to a host hub, it can be necessary to provide the subscriber access terminal AT with two antennas (which are directed towards the two different hubs) and with a two-ways radio frequency switch, or with a single antenna with electronically routed beams. This situation is depicted in Fig. 3.

As it is understood, with the inventive system it is not so mandatory to provide any stand-by radio node (any expensive RN stand-by), since the redundancy switching logic is, as it has been seen, in the subscriber access terminal (AT).

The procedure which is possible to activate from failure detection to restore of system proper function is below described, only for example purpose:

1. the management system (or local intelligence) MS detects fault on a radio node;
2. the MS turns off the transmitter of the faulty RN;
3. the subscriber AT inside the "faulty" sector does not receive downstream traffic and automatically tunes the "host" frequency, the "host" frequency might have been pre-stored during the installation phase;
4. if the "host" RN belongs to a different ("host") Hub, then the antenna switch will be routed to the second antenna;
5. the "host" RN manages the new subscriber ATs;
6. the MS re-routes all traffic connections to the host RN,
7. after faulty unit has been restored, MS communicates to the ATs to switch to the original home RN.

The invention ensures noticeable benefits, among which, without seek for completeness, it is to mention the cost efficiency in terms of equipment and infrastructures (tower, power, etc.) since no dedicated stand-by unit is needed and an easy upgrade with no impact on the redundancy configuration.

It is understood that embodiments and/or modifications of the system, other than the ones illustrated, are possible, still remaining in the scope of the present invention.

CLAIMS

1. Access terminal re-routing redundancy capability in point-multipoint radio communication systems, consisting of giving a subscriber access terminal the feature to automatically and autonomously switch from a radio node, to which it is normally connected, to an alternative radio node, usually not dedicated to the redundancy functionality.

2. Re-routing as claimed in claim 1., wherein a redundancy switching logic is provided in said access terminal, apt to automatically switch to the alternative radio node (host radio node) upon failure in the connection, which normally operates between the terminal itself and the home radio node.

3. Re-routing as claimed in any claim 1. and 2., wherein the host radio node is capable to be allocated to other access terminals located in the same sector and has the possibility to bear an additional traffic.

4. Re-routing as claimed in any claim 1. to 3., wherein said alternative radio node is located in the same hub as the radio node with respect to which it has been switched.

5. Re-routing as claimed in any claim 1. to 3., wherein said alternative radio node is located in a hub different than the one where the radio node with respect to which it has been switched is.

6. Re-routing as claimed in claim 5., wherein the access terminal is provided with two antennas directed towards said two different hubs and with a two-ways radio frequency switch, or with a single antenna with electronically routed beams.

AMENDED CLAIMS

[received by the International Bureau on 07 December 2000 (07.12.00);
original claim 1 amended; remaining claims unchanged (1 page)]

1. Access terminal re-routing redundancy capability in point-multipoint radio communication systems for fixed services (FS) and fixed wireless access applications (FWAA), consisting of giving a subscriber access terminal the feature to automatically and autonomously switch from a radio node, to which it is normally connected, to an alternative radio node, usually not dedicated to the redundancy functionality.

2. Re-routing as claimed in claim 1., wherein a redundancy switching logic is provided in said access terminal, apt to automatically switch to the alternative radio node (host radio node) upon failure in the connection, which normally operates between the terminal itself and the home radio node.

3. Re-routing as claimed in any claim 1. and 2., wherein the host radio node is capable to be allocated to other access terminals located in the same sector and has the possibility to bear an additional traffic.

4. Re-routing as claimed in any claim 1. to 3., wherein said alternative radio node is located in the same hub as the radio node with respect to which it has been switched.

5. Re-routing as claimed in any claim 1. to 3., wherein said alternative radio node is located in a hub different than the one where the radio node with respect to which it has been switched is.

6. Re-routing as claimed in claim 5., wherein the access terminal is provided with two antennas directed towards said two different hubs and with a two-ways radio frequency switch, or with a single antenna with electronically routed beams.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(30) Priority Data:
99830527.0 19 August 1999 (19.08.1999) EP

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(72) Inventor; and

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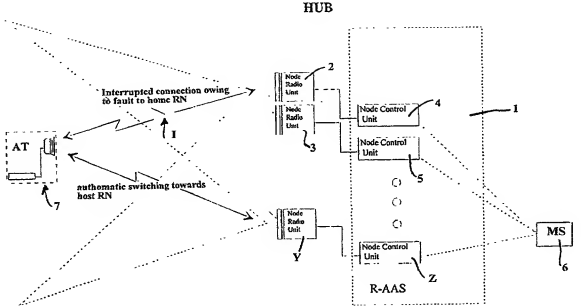
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*
— *With amended claims.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ROUTING REDUNDANCY METHOD IN A POINT TO MULTIPOINT RADIO SYSTEM FOR AN ACCESS TERMINAL



(57) Abstract: Access terminal re-routing redundancy capability in point-multipoint radio communication systems, consisting of giving a subscriber access terminal the feature to automatically and autonomously switch from a radio node, to which it is normally connected, to an alternative radio node, usually not dedicated to the redundancy functionality. To this purpose, a redundancy switching logic is provided in said access terminal apt to automatically switch to the alternative radio node (host radio node) upon failure in the connection, which normally operates between the terminal itself and the home radio node.

WO 01/15467 A1

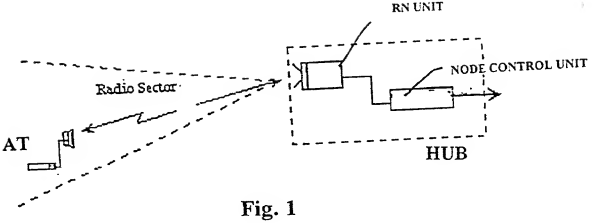


Fig. 1

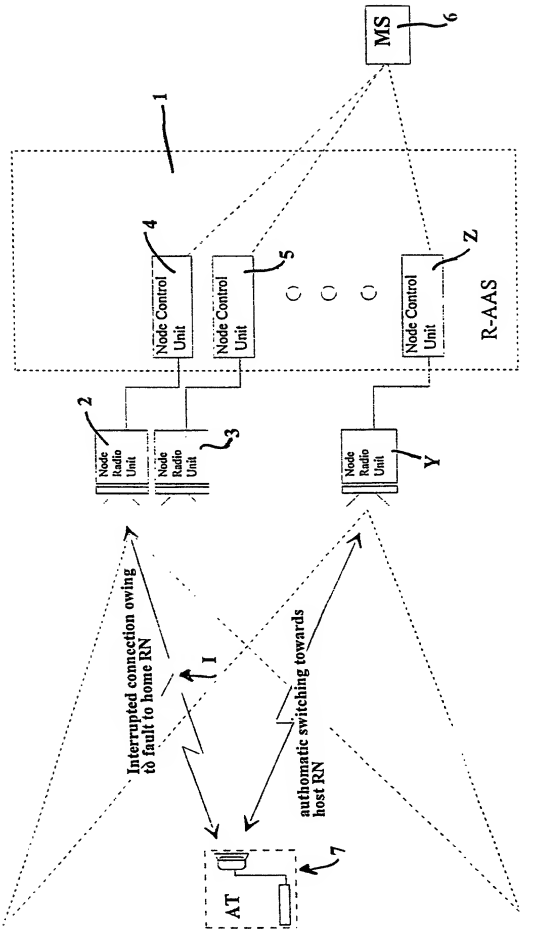


Fig.2

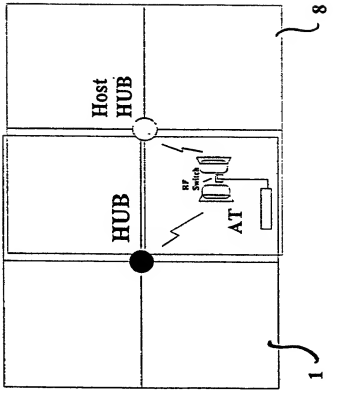


Fig. 3

RULE 63 (37 C.F.R. 1.63)
DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

ROUTING REDUNDANCY METHOD IN A POINT TO MULTIPOINT RADIO SYSTEM FOR AN ACCESS TERMINAL

the specification of which (**check** applicable **box(s)**):

☐ is attached hereto
☐ was filed on _____ as U.S. Application Serial No. _____ (Atty Dkt. No. _____)
☒ was filed as PCT international application No. PCT/IB00/01085 on 3.08.2000
and (if applicable to U.S. or PCT application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 C.F.R. 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed or, if no priority is claimed, before the filing date of this application:

Priority Foreign Application(s):

Application Number	Country	Day/Month/Year Filed
99830527.0	EUROPE	19.08.1999

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below.

Application Number	Date/Month/Year Filed

I hereby claim the benefit under 35 U.S.C. 120/365 of all prior United States and PCT international applications listed above or below and, insofar as the subject matter of each of the claims of this application is not disclosed in such prior applications in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56 which occurred between the filing date of the prior applications and the national or PCT international filing date of this application:

Prior U.S./PCT Application(s): Application Serial No.	Day/Month/Year Filed	Status: patented pending, abandoned

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon. And I hereby appoint **NIXON & VANDERHYE P.C., 1100 North Glebe Rd., 8th Floor, Arlington, VA 22201-4714**, telephone number (703) **816-4000** (to whom all communications are to be directed), and the following attorneys thereof (of the same address) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent: Arthur R. Crawford, 25327; Larry S. Nixon, 25640; Robert A. Vanderhye, 27076; James T. Hosmer, 30184; Robert W. Faris, 31352; Richard G. Besha, 22770; Mark E. Nusbaum, 32348; Michael J. Keenan, 32106; Bryan H. Davidson, 30251; Stanley C. Spooner, 27393; Leonard C. Mitchard, 29009; Duane M. Byers, 33363; Jeffry H. Nelson, 30481; John R. Lastova, 33149; H. Warren Burnam, Jr., 29366; Thomas E. Byrne, 32205; Mary J. Wilson, 32955; J. Scott Davidson, 33489; Alan M. Kagen, 36178; William J. Griffin, 31260; Robert A. Molan, 29834; B. J. Sadoff, 36663; James D. Berquist, 34776; Updeep S. Gill, 37334; Michael J. Shea, 34725; Donald L. Jackson, 41090; Michelle N. Lester, 32331; Frank P. Presta, 19828; Joseph S. Presta, 35329.

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Residence: (city) TORRE D'ISOLA (state/country) Italy
Post Office Address: Via S. Sofia
(Zip Code) 27020 TORRE D'ISOLA - Italy

2. Inventor's Signature: _____ Date: _____
Inventor: _____ (first) _____ MI _____ (last) _____ (citizenship)
Residence: (city) _____ (state/country) _____
Post Office Address: _____
(Zip Code) _____

3. Inventor's Signature: _____ Date: _____
Inventor: _____ (first) _____ MI _____ (last) _____ (citizenship)
Residence: (city) _____ (state/country) _____
Post Office Address: _____
(Zip Code) _____

FOR ADDITIONAL INVENTORS, check box ☐ and attach sheet with same information and signature and date for each.